

ROCKER SWITCH

FIELD OF THE INVENTION

The present invention relates to power switches, and more particularly to a power switch equipped with a position holding mechanism that comprises a spring and an extension rod.

BACKGROUND OF THE INVENTION

The main usage of a power switch is to control the power to open and close a circuit. The power switch can be divided 10 into different types according to structure, such as the common push switch and rocker switch.

Please refer to FIG. 1 for a cross-sectional view of a conventional rocker switch, which comprises a common contact point 70, a closed circuit contact point 71, a movable contact point 72 permanently coupled to the common contact point 70, a rocking button 73 for coupling the movable contact point 72 and selectively rocking the movable contact point 72 between a close circuit position and an open circuit position, and a position holding spring 75. Such a position holding 15 spring 75 is a compressed spring with one end passing into the bottom 74 of the rocking button 73 and the other end pressing against the movable contact point 72. Regardless of the rocking button 73 position either set to the close circuit position (i.e. the position where the close circuit contact point 20 is touching the movable contact point) or the open circuit 25

position (i.e. the position where the open circuit contact point is not touching the contact point), the position holding spring 75 is compressed and accumulates with energy, and a deformation is produced by twisting the position holding 5 spring 75 along the axial direction. In FIG. 1, the position holding spring 75 produces a reaction due to the compression, and produces a pushing force at the point P of the rocking button 73. Such pushing force pushes the rocking button 73 to rock about its pivotal axis, and the rocking button 73 is 10 pushed by the position holding spring 75 to stop when one of its sides presses against the bottom base 76 of the rocker switch. Such relation will be changed alternatively under the operation of repeatedly switching the rocking button 73, and the movable contact point 72 will be pushed to the close 15 circuit position (i.e. the position where the close circuit contact point is in touch with the movable contact point) or the open circuit position (i.e. the position where the open circuit contact point is in touch with the movable contact point) as the position holding spring 75 is twisted and deformed repeatedly.

20 However, the position holding spring 75 according to the aforementioned prior art has two main functions: one is to use a rebounding force produced by the permanent compression to push the rocking button 73 and select the close circuit position or open circuit position; and the other is to carry out the 25 mission of flipping the movable contact point 72 when the

position holding spring 75 is twisted to deform repeatedly. If such rocker switch is used in an environment of higher temperature, such as being installed in an oven, the repeated twisting and deformation will cause a permanent deformation

5 to the compressed spring very easily. Therefore, the rocker switch cannot be kept in the close circuit position or an open circuit position. After a long-time use, the position holding spring 75 is loosened and the rocker switch no longer can keep a safe distance (such as 3 mm according to the European safety

10 regulation) between the movable contact point and the close circuit contact point even the rocker switch is set to the close circuit position. Further, there are prior arts as disclosed in U.S. Patent Nos. 4,431,880 and 5,950,812 teaching more complicated structures of the rocker switch.

15 **SUMMARY OF THE INVENTION**

The primary objective of the present invention is to provide a rocker switch with good heat-resistance. The rocker switch according to the present invention redesigns the position holding mechanism to improve the reliability of the movement

20 and the heat-resistance of the rocker switch. For the position holding mechanism of the invention, an extension rod with one end passing into a rocking button and the other end connecting to a spring are used to change the position of the force acting between the spring and the rocking button and the force acting

25 on the spring in order to improve the life of the spring and the

heat resistance.

Another objective of the present invention is to provide a rocker switch with a high reliability. The position holding mechanism designed for the invention includes an extension 5 rod with one end passing into the rocking button, and the other end of the extension rod and one end of the spring are extended into a movable contact point. Therefore, the extension rod will directly link the contact points to assure the reliability of movement when the rocking button is clicked.

10 To make it easier for our examiner to understand the objective of the invention, its structure, features, and performance, we use a preferred embodiment together with the attached drawings for the detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

15 FIG. 1 is a cross-sectional view of a prior-art rocker switch. FIG. 2 is a perspective view of the rocker switch of the present invention. FIG. 3A is a cross-sectional view of the section 3A-3A of FIG. 2 illustrating the separation of the close circuit contact point 20 and the movable contact point when the rocker switch is set to the close circuit position.

FIG. 3B is a view of the successive movements of contacting the close circuit contact point with the movable contact point when the rocker switch is set to close.

25 **DETAILED DESCRIPTION OF THE PREFERRED**

EMBODIMENTS

Please refer to FIGS. 2 and 3A for the rocker switch of the present invention, basically having its components installed on a base 10, and these components include:

- 5 a common contact pin 20, which is a metal component, having an external connecting section 201 passing through the bottom of the base 10 for connecting to an electric wire, and a common contact point 202 disposed on the surface of the inner side of the bottom of the base 10;
- 10 a close circuit contact pin 30, which is also a metal component, having an external connecting pin 301 passing through the bottom of the base 10 for connecting an electric wire, and a close circuit contact point 302 disposed on the surface of the inner side of the base 10;
- 15 a movable contact pin 40, which is also a metal component, having a first sidewall 401, a second sidewall 402, a bottom plate 403 connecting the first sidewall 401 and the second sidewall 402, a gap between the first sidewall 401 and the second sidewall 402, and a movable contact point 404
20 protrudes from the surface on the first sidewall facing the close circuit contact point 302, wherein the bottom plate 403 is permanently in contact with a common contact point 202, and the movable contact pin 40 can use the common contact point 202 as the fulcrum to rock itself to contact the close circuit
25 contact point 302 with the movable contact point 404 to define

a close circuit position (see FIG. 3B) or separate the close circuit contact point 302 from the movable contact point 404 to define an open circuit position (see FIG. 3A);

5 a rocking button 50, pivotally coupled to a base 10 with a pivotal axis 501 and having a pressing surface 52 for controlling the rocking button 50 to rock itself about the pivotal axis 501 and pressing one end of the pressing surface 52; and

10 a position holding mechanism, comprising a spring 60 and an extension rod 61, and one end of the extension rod 61 being coupled to one end of the spring 60 and extended between the first sidewall 401 and the second sidewall 402 of the movable contact pin 40, and the one end of the spring 60 preferably connected to one end of the extension rod 61, and the spring 15 60 being a compressed spring with one end pressing against the bottom plate 403 of the movable contact pin 40 when the spring 60 is compressed.

In FIG. 3A, if the rocker switch is set to open circuit status (i.e. the position of separating the close circuit contact point 20 from the movable contact point), the spring 60 will produce a pushing force acting on the extension rod 61 due to the reaction produced by the compression of the spring 60. Since the extension rod 61 passes through a hole 51 at the bottom of the rocking button 50, the position of the force 25 acting between the spring 60 and the rocking button 50 will be

shifted to exterior of the hole 51. Unlike the prior-art technology shown in FIG. 1, the present invention can shorten the length of the spring 60 and reduce the adverse effect of the heat on the spring 60 to improve the life of the spring 60 and 5 its heat resistance. The pushing force of the spring 60 pushes the rocking button 50 about its pivotal axis 501 to produce a rocking movement. The rocking movement will be stopped by a blocking edge 11 disposed on the base 10 of the rocker switch when the rocking button 50 pushed by the spring 60 10 presses on one side of the blocking edge 11.

If the right side of the pressing surface 52 of the rocking button 50 is pressed, the rocking button 50 will rock itself about the pivotal axis 501 into a close circuit position (as shown in FIG. 3B). Since the extension rod 61 of the 15 invention passes into the rocking button 50 and its end connected to the spring 60 extends into a position between the first sidewall 401 and the second sidewall 402 of the movable contact pin 40, therefore when the rocking button 50 is clicked, the extension rod 61 directly drives the movable contact point 20 404 to a close circuit position by moving the close circuit contact point 302 to contact with the movable contact point 404 in order to ensure the reliability of the movement. In a preferred embodiment of this invention, the internal diameter of a hole 51 disposed at the bottom of the rocking button 50 is 25 slightly larger than the external diameter of the extension rod

61, so that the force acting between the spring 60 and the
rocking button 50 increases with respect to the arm of moment
about the pivotal axis 501 to improve the stability of the
rocking button 50 to set the rocker switch to the close circuit
5 position or open circuit position.